MA 35 J(88)-1

CURRENT INDUSTRIAL REPORTS

Selected Industrial Air Pollution Control Equipment
1988

U.S. Department of Commerce
BUREAU OF THE CENSUS

MA35J(88)-1
Issued November 1989

SUMMARY OF FINDINGS

Shipments of industrial air pollution devices in 1988 totaled $547 million, of which $355 million were particulate emissions collectors, $143 million were gaseous emissions control devices, and $48 million were other types of air pollution control equipment. Shipments increased by 5 percent from the 1987 level of $518 million.

New orders increased by 21 percent in 1988 to $606 million. Backlog of orders declined by 13 percent in 1988 to $470 million.

A description of the survey methodology and related information appears on page 3.

Table 1. NEW ORDERS, SHIPMENTS, AND BACKLOG OF ORDERS FOR SELECTED INDUSTRIAL AIR POLLUTION CONTROL EQUIPMENT: 1988 AND 1987

(Quantity in number of units; value in thousands of dollars)

Product code	Product description	Number of companies	New orders		Shipments		Backlog of orders, December 31	
			Quantity	Value	Quantity	Value	Quantity	Value
	1988							
35646 —	Selected industrial air pollution control equipment	120	(X)	605,932	(X)	546,875	(X)	469,752
	Particulate emissions collectors	(X)	(X)	355,349	(X)	355,353	(X)	199,129
35646 51	Electrostatic precipitators	19	71	135,258	88	123,449	67	117,320
35646 54	Fabric filters	58	30,861	160,904	25,230	176,569	7,789	59,431
35646 55	Mechanical collectors	41	5,193	30,633	5,596	32,600	982	8,862
35646 58	Wet scrubbers	38	1,202	28,554	1,204	22,735	626	13,516
	Gaseous emissions control devices	(X)	(X)	197,787	(X)	143,055	(X)	247,290
35646 62	Catalytic oxidation systems	8	125	18,408	116	15,312	30	8,309
35646 64	Thermal and direct oxidation systems	14	316	36,137	239	32,591	116	13,673
35646 65	Scrubbers (gas absorber)	13	723	10,765	693	9,721	143	4,141
35646 66	Flue gas desulfurization systems	13	52	126,471	79	78,801	41	214,499
35646 67	Gas adsorbers	9	162	6,006	155	6,625	20	6,668
35646 68	Other types of industrial air pollution control equipment	22	(X)	52,796	(X)	48,467	(X)	23,333
	1987							
35646 —	Selected industrial air pollution control equipment	117	(X)	501,815	(X)	r518,455	(X)	r531,501
	Particulate emissions collectors	(X)	(X)	322,324	(X)	r334,371	(X)	r283,743
35646 51	Electrostatic precipitators	20	86	108,577	116	119,885	73	r174,163
35646 54	Fabric filters	59	r27,677	160,678	r22,864	163,335	r8,476	90,592
35646 55	Mechanical collectors	40	5,756	31,010	5,138	27,887	1,485	11,107
35646 58	Wet scrubbers	38	1,284	22,059	1,137	r23,264	880	r7,881
	Gaseous emissions control devices	(X)	(X)	r143,210	(X)	r151,276	(X)	r228,884
35646 62	Catalytic oxidation systems	6	130	r14,727	117	r14,831	r27	r3,773
35646 64	Thermal and direct oxidation systems	10	367	26,892	375	24,084	83	r9,564
35646 65	Scrubbers (gas absorber)	11	894	11,011	809	r9,304	185	3,614
35646 66	Flue gas desulfurization systems	14	48	82,138	103	r96,357	r52	r203,541
35646 67	Gas adsorbers	9	153	8,442	136	6,700	30	r8,392
35646 68	Other types of industrial air pollution control equipment	18	(X)	36,281	(X)	32,808	(X)	18,874

Note: Ending backlog of orders for 1987 plus new orders for 1988 minus shipments for 1988 does not necessarily equal backlog for 1988.

rRevised by 5 percent or more from previously published figures. (X) Not applicable.

Address inquiries concerning these figures to U.S. Department of Commerce, Bureau of the Census, Industry Division, Washington, D.C. 20233, or call Robert Wright, (301) 763-5547.

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Table 2. VALUE OF SHIPMENTS OF SELECTED AIR POLLUTION CONTROL EQUIPMENT, BY END USE: 1988 AND 1987

(Thousands of dollars)

Product description	Particulate emissions collectors		Gaseous emissions control devices		Other types of industrial air pollution control equipment	
	1988	1987	1988	1987	1988	1987
Shipments	355,353	334,371	143,055	r151,276	48,467	32,808
Steam electric utility power plants	114,372	107,919	38,082	r49,891	(D)	(D)
Steam industrial power plants	22,794	36,091	24,882	22,089	(D)	(D)
Coal mining and cleaning	4,391	(D)	-	(D)	(D)	(D)
Petroleum refining	8,179	7,723	4,164	(D)	-	-
Foundries	4,167	2,885	(D)	-	-	-
Iron and steel mills	6,147	3,201	470	(D)	(D)	(D)
Primary nonferrous metal smelting plants	3,084	3,517	(D)	(D)	(D)	(D)
Chemical and fertilizer production	23,634	26,224	5,520	6,390	(D)	(D)
Cement manufacturing	8,451	(D)	-	-	(D)	-
Grain milling and handling	6,476	5,741	-	(D)	(D)	-
Pulp and papermill operations	39,422	22,352	(D)	(D)	(D)	-
Other end use industries	114,236	113,317	62,522	r64,981	24,130	r9,144

- Represents zero. (D) Data withheld to avoid disclosing figures for individual companies. rRevised by 5 percent or more from previously published figures.

Table 3. VALUE OF SHIPMENTS AND EXPORTS OF SELECTED INDUSTRIAL AIR POLLUTION CONTROL EQUIPMENT: 1988 AND 1987

(Value in thousands of dollars)

Product code	Product description	Manufacturers' shipments	Exports of domestic merchandise[1]	Estimated producers' value[2]	Percent exports to manufacturers' shipments
	1988				
35646 --	Selected industrial air pollution control equipment	546,875	89,829	80,613	15
	1987				
35646 --	Selected industrial air pollution control equipment	518,455	56,031	50,215	10

Note: Comparison of Standard Industrial Classification-based product code with Schedule B export number is as follows:

Product code	Schedule B export number[3]	Description
35646--	661.9805	Electrostatic precipitators for industrial use
	661.9806	Industrial gas cleaning equipment n.s.p.f.
	661.9825	Dust collection and air purification equipment

N.s.p.f. Not specifically provided for.

[1] Source: Bureau of the Census report EM 546, U.S. Exports.

[2] This value was derived by use of adjustment factors to exclude freight, insurance, and other charges incurred in moving goods to the port of export. This adjustment is made to convert the values to an approximation of the producers' value of exported goods. Current adjustment factors are based on data for 1986 which are published in Exports from Manufacturing Establishments, AR86-1, appendix B. The F.O.B. adjustment factor for this report is 0.8974.

[3] Source: Schedule B, Statistical Classification of Domestic and Foreign Commodities Exported from the United States, revised January 1987.

DESCRIPTION OF SURVEY

Scope of Survey. This survey covers firms engaged in the manufacture of selected industrial air pollution control equipment.

Survey Methodology. The statistics in this publication were collected by mail on Bureau of the Census annual Form MA35J, Selected Air Pollution Control Equipment. The survey panel includes all known manufacturers of the selected products specifically designed for use in air pollution control, approximately 136 companies.

Reliability of Data. Survey error may result from several sources: (1) inability to obtain information about all cases in the survey; (2) response errors; (3) definitional difficulties; (4) differences in the interpretation of questions; (5) mistakes in recording or coding the data obtained; and (6) other errors of collection, response, coverage, and estimation for missing data. These nonsampling errors also occur in complete censuses. Although no direct measurement of the biases due to nonsampling errors has been obtained, precautionary steps were taken in all phases of the collection, processing, and tabulation of the data in an effort to minimize their influence.

A major source of bias in the published estimates is due to imputing data for nonrespondents, for late reporters, and for data which fail logic edits. Missing figures are imputed based on yearly movements shown by reporting firms. Imputation generally is limited to a maximum of 15 percent for any one data cell. Figures with imputation rates greater than 15 percent are footnoted.

The imputation rate is not an explicit indicator of the potential error in published figures due to nonresponse because the actual yearly movements for nonrespondents may or may not closely agree with the imputed movements. The range of difference between the actual and imputed figures is not precisely known, but is assumed to be small. The degree of uncertainty regarding the accuracy of the published data increases as the percentage of imputation increases. Figures with imputation rates above 15 percent should be used with caution.

Revisions to Previous Period Data. Statistics for previous years may be revised as the result of corrected data from respondents, late reports for which imputations were made as described above, or other corrections. Figures which have been revised by more than 5 percent from previously published figures are indicated by footnotes.

Adjustment for Price Change. All dollar figures included in this publication are in current dollars; i.e., they have not been adjusted for price change.

EXPLANATION OF TERMS

Value of Shipments. Represents the value of physical shipments of all products sold, transferred to other establishments of the same company, or shipped on consignment, whether for domestic or export sale. The value represents the net sales price, f.o.b. plant, to the customer or branch to which the products are shipped, net of discounts, allowances, freight charges, and returns. Shipments to a company's own branches are assigned the same value as comparable sales to unaffiliated customers; i.e., the value includes an appropriate allocation of company overhead and profit. Products bought and resold without further manufacture are excluded.

Net New Orders (Bookings). Orders received during the year minus all cancellations received during the same year. Net new orders are defined to include (a) the sales value of orders accepted during the reporting period for products and services to be delivered at some future date; (b) plus the sales value of orders received during the reporting period for immediate delivery; (c) plus or minus the net sales value of contract change documents which increase, decrease, (or equal), the sales values of previous orders when the parties concerned are in substantial agreement as to the amount involved. Included as orders are only those orders that are supported by binding legal documents, such as signed contracts, letters or awards, or letters of intent. In the case of letters of intent, the full amount of sales value is included if the parties concerned were in substantial agreement on this amount; other wise, only the funds specially authorized to be expanded are included. Orders received and canceled during the year are excluded.

Backlog of Orders. All orders that have not yet been reflected as shipments. Generally, unfilled orders at the end of the reporting period are equal to unfilled orders at the end of the prior period, plus net new orders received, less net shipments.

Particulate Emissions Collectors

Electrostatic Precipitator. A device which separates aerosal particulate matter (solid or liquid) from industrial gases by imparting an electric charge to the particles and removing them from the gas stream with the force created by an electric field.

Fabric Filter. A device in which the dustbearing gas is passed through a fabric in such a manner that the dust particles are retained on the up stream or "dirty" gas side of the fabric, while the cleaned gas passes through the fabric to the down stream or clean gas side, where it is removed by natural and/or mechanical means. The fabric may be of any fibrous material, natural or manmade.

Mechanical Collector. A device for the separation in a dry state of entrained particulate material from a gas stream by the application of one or a combination of the following forces; centrifugal, inertial, and gravitational.

Wet Scrubber. A device for the removal of particulate contaminants from a gas stream by means of intimate contact with scrubbing liquid. (If water is added in any form, consider it a scrubber, except wetted wall electronic precipitators and those devices which are primarily mechanical collectors.)

Gaseous Emissions Control Devices

Catalytic Oxidation Systems. A device for the removal of combustible air contaminants in which the contaminantladen stream is preheated by a suitable heating mechanism, then passed through a catalyst bed that initiates and promotes oxidation of the combustible contaminants to carbon dioxide, water vapor, and other compounds less noxious than those originally in the gas stream.

Thermal and Direct Oxidation Systems

Thermal Oxidation System. A device for the correction of combustible air contaminants in which the contaminant-laden gas stream is passed over a burner or other suitable preheat devices to a thermal residence chamber where the contaminant materials are oxidized to carbon dioxide, water vapor, and other materials less noxious than those originally in the gas stream.

Direct Oxidation System. A device for the destruction of concentrated combustible or oxidant streams in which the air contaminant is reacted directly with a fuel or with oxidizing air in a burner flame and the products of combustion exhausted into the atmosphere directly or through a suitable incineration chamber and stack.

Scrubber (Gas Absorber). A device for the removal of soluble or reactive gaseous material from gas streams by contacting the stream with water, aqueous chemical solution, or other scrubbing liquids. The process involves a chemical reaction.

Flue Gas Desulfurization Systems (FGD). Chemical process plants designed primarily for the removal of sulfur oxides from gaseous products of combustion emitted to the atmosphere from the use of fossil fuels in boilers or other combustion devices operated for the generation of thermal or combustion devices operated for the generation of thermal or electric energy. The system extends from gas inlet to gas discharge, including all required auxiliaries and controls.

Gas Absorber. A device for the removal of air contaminants by absorption on a surface-active solid, such as activated carbon or molecular sieves. Depending on the application, the absorbent is either discarded or regenerated.

COMPARISON OF EXPORT, IMPORT, AND DOMESTIC OUTPUT DATA

The Standard Industrial Classification (SIC) system used for domestic output and the statistical export and import commodity classifications were developed independently. This results in considerable difficulty in comparing the three types of data for many commodity areas. The domestic output classification is based on type of industry; on the other hand, the export and import classification system is more materials oriented. Also, there are a substantial number of imported commodities which are have no comparable domestic output classification. The relationships shown in this report should be considered only as approximations, since, in addition to the problems mentioned above, there are also the following problems affecting the comparability of the three sets of data.

Valuation. There are different methods of valuation for the three types of data:

- *Domestic Output.* Valued at the point of production. It includes the net sales price, f.o.b. plant, after discounts and allowances, exclusive of freight charges and excise taxes.
- Exports. Valued at the point of exportation. It includes the selling price, or cost if not sold, and inland freight, insurance and other charges to the export point.

  Estimated producers' values of exports have also been developed. These values more closely approximate the values reported for domestic output because they exclude freight, insurance, and other charges applied from the producing plant to the export point.
- *Imports.* Valued at the first port of entry in the United States. It includes c.i.f. (cost, insurance, and freight), duty, and other charges to the import point.

Duplication in Quantity and Value of Output. Because producers' shipments of some commodities may be used as materials for incorporation into other commodities, combinations of data for such commodities may contain a certain amount of duplication. Thus, percentages of exports to output or imports to apparent consumption (output plus imports minus exports) at fourdigit or broader levels may be understated. Where duplication is known to be substantial, the output data are appropriately noted in the table.

Low-Value Import and Export Transactions. Detailed commodity information is not included for individual export shipments valued at not more than $1,500. Generally, detailed commodity information is not included for individual import shipments valued at not more than $1,000. For textiles and textile products, gloves, footwear, and miscellaneous rubber and plastics products,

detailed commodity information is not included for individual import shipments valued at not more than $250. This is believed to have only negligible effects on the statistics for the bulk of the commodities.

Manufacturers' Shipments, Not Specified by Kind. The value of manufacturers' shipments at the four-digit industry level often includes a small amount which is not distributed among the individual five-digit product classes. Export and import percentages at the more detailed levels might, therefore, be slightly overstated.

Time Lag Between Output and Exports. There will be a lag between the time a commodity is produced or shipped by the producer and the time it is actually exported, especially when intermediaries (wholesalers, exporters, etc.) are involved. Ordinarily, this type of discrepancy is insignificant in annual figures.

"Direct" vs "Total" Commodity Exports and Imports. Export and import data do not include materials which are incorporated into other more finished products and exported or imported in finished form. Thus, by showing only direct exports and imports, the relation of exports to output and imports to apparent consumption for intermediate products is considerably understated.

Used Commodities. With a few exceptions, used or rebuilt commodities are classified in the same import or export codes as is new merchandise. Percentages are thus overstated to the extent that used or rebuilt products are significant in trade.

Geographic Area of Coverage . Import and export data reflect the movement of merchandise into and out of U.S. foreign trade zones, the U.S. Virgin Islands, and the U.S. customs territory (includes the 50 States, the District of Columbia, and Puerto Rico).

HISTORICAL NOTE

Data on selected air pollution control equipment have been collected by the Bureau of the Census since 1971. Historical data may be obtained from Current Industrial Reports available at your local Federal Depository Library. A list of these libraries may be obtained from the Bureau of the Census regional offices:

Office	Telephone
Atlanta, Georgia	(404) 347-2271
Boston, Massachusetts	(617) 223-2327
Charlotte, North Carolina	(704) 371-6142
Chicago, Illinois	(312) 353-6251
Dallas, Texas	(214) 767-0621
Denver, Colorado	(303) 236-2200
Detroit, Michigan	(313) 226-7742
Kansas City, Kansas	(816) 374-4601
Los Angeles, California	(213) 209-6616
New York, New York	(212) 264-3860
Philadelphia, Pennsylvania	(215) 597-4920
Seattle, Washington	(206) 442-7828

Historical data are also available on microfiche. For further information contact the Bureau of the Census, Data User Services Division, (301) 763-4100.

RELATED REPORTS

The Bureau of the Census publishes the following related reports:

Series	Frequency	Title
Current Industrial Reports		
MA35M	Annually	*Air Conditioning and Refrigeration Equipment*
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M3-1	Monthly	*Manufacturers' Shipments Inventories, and Orders*
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(MC)	Quinquennially	Census of Manufactures
MA200	Annually	*Pollution Abatement Expenditures*
Foreign Trade Reports		
EM 546 FT 446	Monthly Annually	*U.S. Exports—Schedule B—Commodity by Country*
IM 146 FT 246	Monthly Annually	*U.S. Imports for Consumption—TSUSA—Commodity by Country*

CONTACTS FOR DATA USERS

Subject Area	Contact	Phone Number
Current Industrial Report MA35J	Robert Wright	(301) 763-5547
Survey of Pollution Abatement Costs and Expenditures	Elinor Champion	(301) 763-5616
Foreign Trade	Trade Data Inquiries Staff (FTD)	(301) 763-5140
Classification Systems Comparability	Francis McCormick (ESD)	(301) 763-1935

Subject Area	Contact	Phone Number
Census/ASM	Tom Lee	(301) 763-5752
International Trade Administration	Ed Abrahams	(202) 377-0312
To order a Current Industrial Report	Superintendent of Documents (GPO)	(202) 783-3238
To subscribe to a Census Bureau publication	Superintendent of Documents (GPO)	(202) 275-3054

ACKNOWLEDGMENTS

This report was prepared in the Industry Division, Bureau of the Census, under the direction of Malcolm E. Bernhardt, Chief, Current Durables Branch, and Milbren Thomas, Chief, Metals Section. Robert Wright was directly responsible for the review of the data and preparation of the report. Gaylord Worden, Chief of the Division, and Robert N. Tinari, Assistant Chief for Current Industrial Reports, provided overall direction and coordination to this project.

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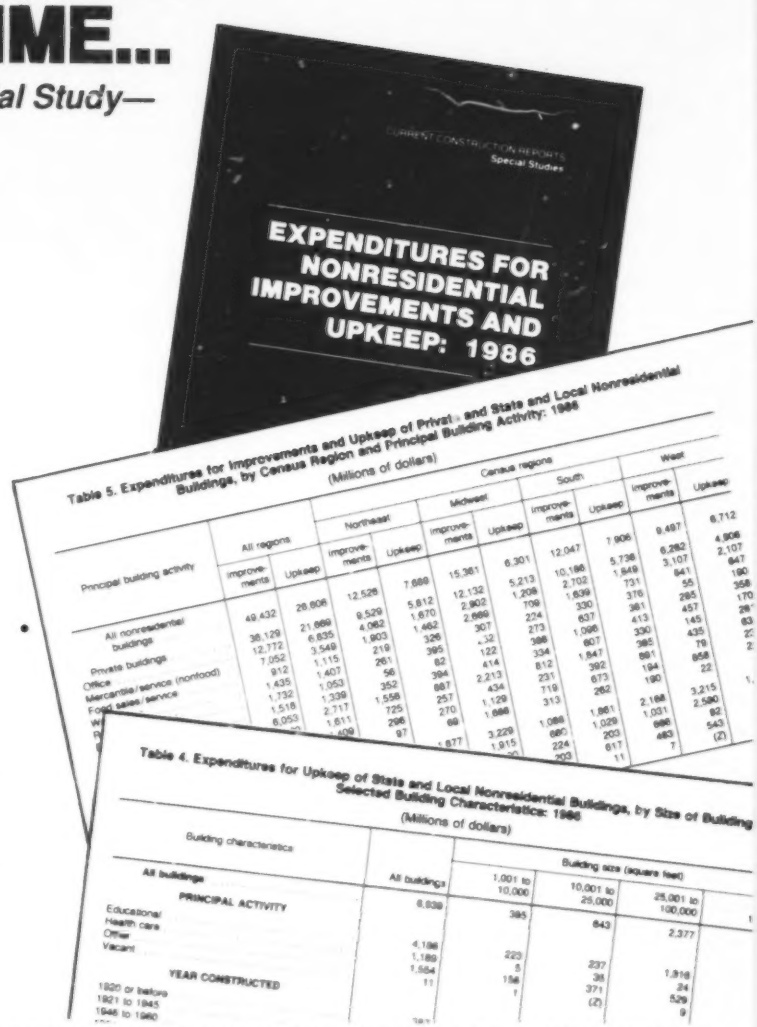
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Special Studies
EXPENDITURES FOR NONRESIDENTIAL IMPROVEMENTS AND UPKEEP: 1986
Table 5. Expenditures for Improvements and Upkeep of Private and State and Local Nonresidential Buildings, by Census Region and Principal Building Activity: 1986
(Millions of dollars)
Table 4. Expenditures for Upkeep of State and Local Nonresidential Buildings, by Size of Building and Selected Building Characteristics: 1986
(Millions of dollars)

Data are provided by:

- **Ownership**
  - **Private buildings**
  - **State and local buildings**
- **Census region**
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